

**Converting Quadratic Functions from Factored Form to Standard Form**  $f(x) = ax^2 + bx + c$

1. Convert  $A(x) = (x-7)^2 = (x-7)(x-7) = x^2 - 14x + 49$

2. Convert  $k(x) = (x-7)(x+4) = x^2 + 4x - 7x - 28 = x^2 - 3x - 28$

3. Convert  $m(x) = \frac{1}{2}(2x-3)(x+8) = \frac{1}{2}(2x^2 + 16x - 3x - 24)$   
 $= \frac{1}{2}(2x^2 + 13x - 24)$   
 $= x^2 + 6.5x - 12$

4. Convert  $h(x) = -(2x+5)(3x-4) = -(6x^2 - 8x + 15x - 20)$   
 $= -(6x^2 + 7x - 20)$   
 $= -6x^2 - 7x + 20$

5. Convert  $p(x) = 2(3x+1)(4x-5) = 2(12x^2 - 15x + 4x - 5)$   
 $= 2(12x^2 - 11x - 5)$   
 $= 24x^2 - 22x - 10$

**Converting Quadratic Functions from Vertex Form  $f(x) = a(x-h)^2 + k$  to Standard Form  $f(x) = ax^2 + bx + c$**

$$\begin{aligned} 6. \text{ Convert } A(x) &= (x-1)^2 - 7 &= (x-1)(x-1) - 7 \\ & &= x^2 - 2x + 1 - 7 \\ & &= x^2 - 2x - 6 \end{aligned}$$

$$\begin{aligned} 7. \text{ Convert } v(x) &= (3x-4)^2 - 9 &= (3x-4)(3x-4) - 9 \\ & &= 9x^2 - 12x - 12x + 16 - 9 \\ & &= 9x^2 - 24x + 7 \end{aligned}$$

$$\begin{aligned} 8. \text{ Convert } k(x) &= -(x-3)^2 + 2 &= -(x-3)(x-3) + 2 \\ & &= -(x^2 - 6x + 9) + 2 \\ & &= -x^2 + 6x - 9 + 2 \\ & &= -x^2 + 6x - 7 \end{aligned}$$

$$\begin{aligned} 9. \text{ Convert } w(x) &= 2(x-6)^2 - 10 &= 2(x-6)(x-6) - 10 \\ & &= 2(x^2 - 12x + 36) - 10 \\ & &= 2x^2 - 24x + 72 - 10 \\ & &= 2x^2 - 24x + 62 \end{aligned}$$

**Converting Quadratic Functions from Standard Form  $f(x) = ax^2 + bx + c$  to Factored Form**

$$10. \text{ Convert } f(x) = x^2 - 4 = (x-2)(x+2)$$

11. Convert  $g(x) = 9 - x^2 = (3 - x)(3 + x)$

12. Convert  $k(x) = x^2 - 4x = x(x - 4)$

13. Convert  $p(x) = x^2 - 6x + 9 = (x - 3)(x - 3)$

14. Convert  $j(x) = x^2 + 6x + 5 = (x + 1)(x + 5)$

15. Convert  $r(x) = 2x^2 - 6x - 8 = 2(x^2 - 3x - 4)$   
 $= 2(x - 4)(x + 1)$

16. Convert  $V(x) = 2x^2 + 3x - 35 = (2x - 7)(x + 5)$

17. Convert  $A(x) = x^2 + 8x + 10$  DNF

$$\begin{aligned}
 18. \text{ Convert } g(x) = x^2 + 10x - 13 &= (x^2 + 10x + 25) - 13 - 25 \\
 &= (x + 5)^2 - 38 \quad V(-5, -38)
 \end{aligned}$$

$$\begin{aligned}
 19. \text{ Convert } p(x) = x^2 + 6x + 9 &= (x^2 + 6x + 9) + 9 - 9 \\
 &= (x + 3)^2 + 0 \quad V(-3, 0)
 \end{aligned}$$

$$\begin{aligned}
 20. \text{ Convert } j(x) = -x^2 + 6x + 5 &= -(x^2 - 6x + 9) + 5 + 9 \\
 &= -(x - 3)^2 + 14 \quad V(3, -14)
 \end{aligned}$$

$$\begin{aligned}
 21. \text{ Convert } r(x) = 2x^2 - 6x - 8 &= 2(x^2 - 3x + \frac{9}{4}) - 8 - \frac{9}{2} \\
 &= 2(x - \frac{3}{2})^2 - 12\frac{1}{2} \\
 &\quad V(\frac{3}{2}, 12\frac{1}{2}) \\
 &\quad V(1\frac{1}{2}, 12\frac{1}{2})
 \end{aligned}$$

$$\begin{aligned}
 22. \text{ Convert } V(x) = 2x^2 + 8x - 3 &= 2(x^2 + 4x + 4) - 3 - 8 \\
 &= 2(x + 2)^2 - 11 \\
 &\quad V(-2, -11)
 \end{aligned}$$